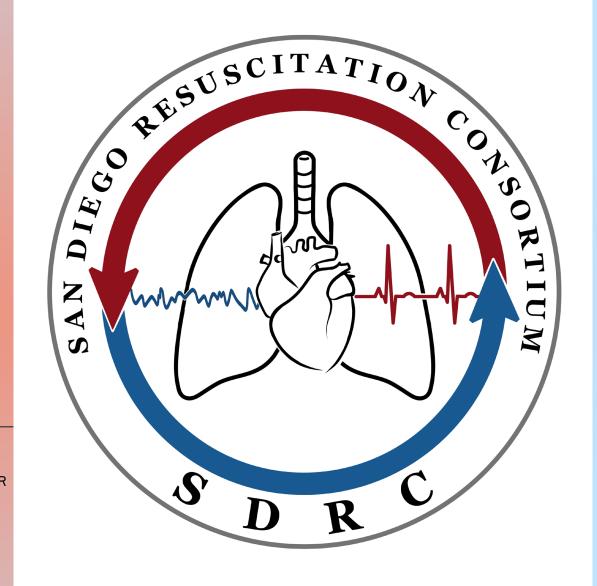
ECPR & San Diego Resuscitation Consortium

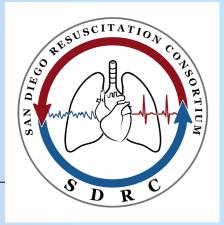
SAUL LEVINE MD
SHARP MEMORIAL EMERGENCY DEPT., BASE HOSPITAL MEDICAL DIRECTOR

MAY 25, 2023

EMCC



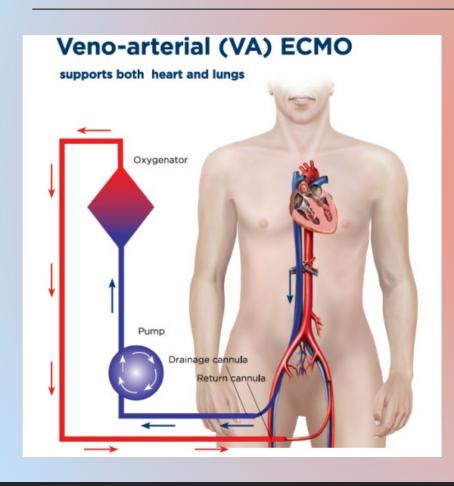
San Diego Resuscitation Consortium



Goal: Save Lives of Cardiac Arrest Victims by employing a unique, timecritical intervention: ECPR

- Establish protocols for delivering ECPR to selected patients in refractory cardiac arrest
- Work within existing infrastructure to operationalize a process; a BSPC workgroup
- Science & evidence based
- > Inclusive
- > Transparent

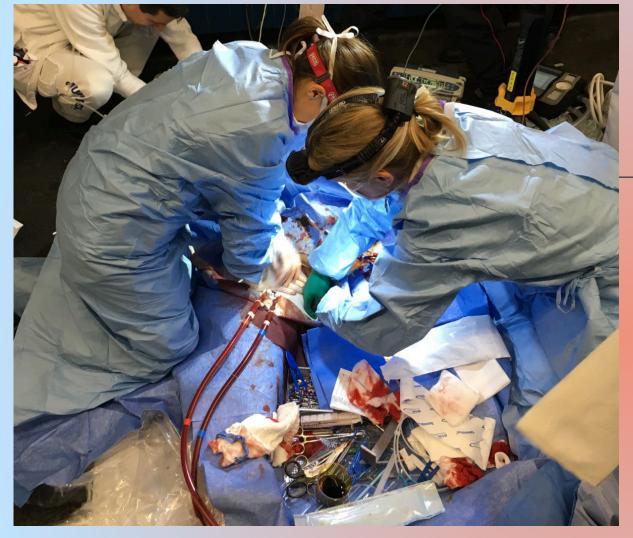
ECMO (VA) & ECPR



Carry oxygenated blood to the body and brain (Heart-Lung Bypass)

Collaborative with EMS, ED, ICU, cardiologists and cardiothoracic surgeons

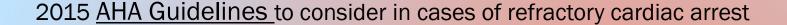
Variety of systems of implementation





ECPR (ExtraCorporeal CPR)

Recommended by international group (ILCOR)



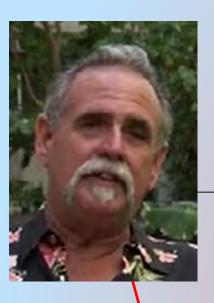




2019 Update: "ECPR may be considered for selected patients as rescue therapy when conventional CPR efforts are failing in settings in which it can be expeditiously implemented and supported by skilled providers"



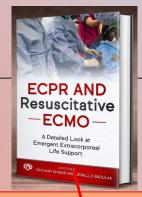




ECPR history in San Diego







All ED
docs
trained
at GMT

2010

1st case

ECPR

OHCA in

SD

2011

All ED docs at Sharp Memoria

Memorial trained

2017

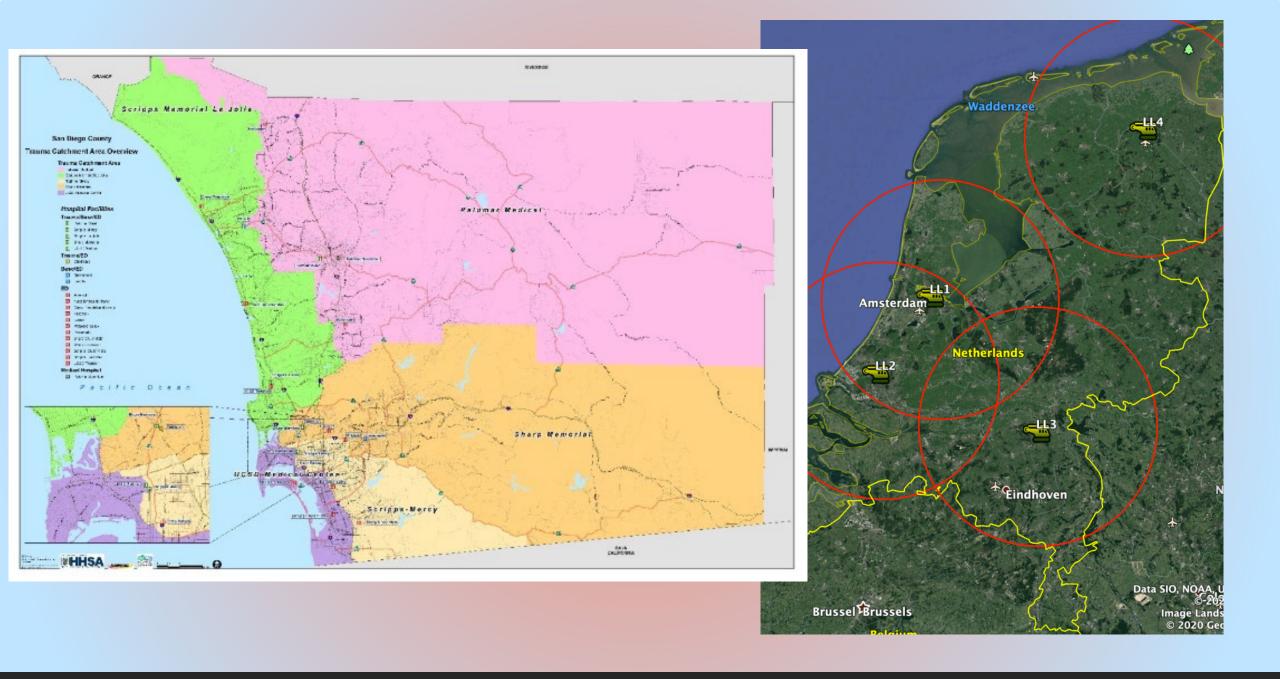
All ED
docs
trained
at
Scripps
La Jolla

2021

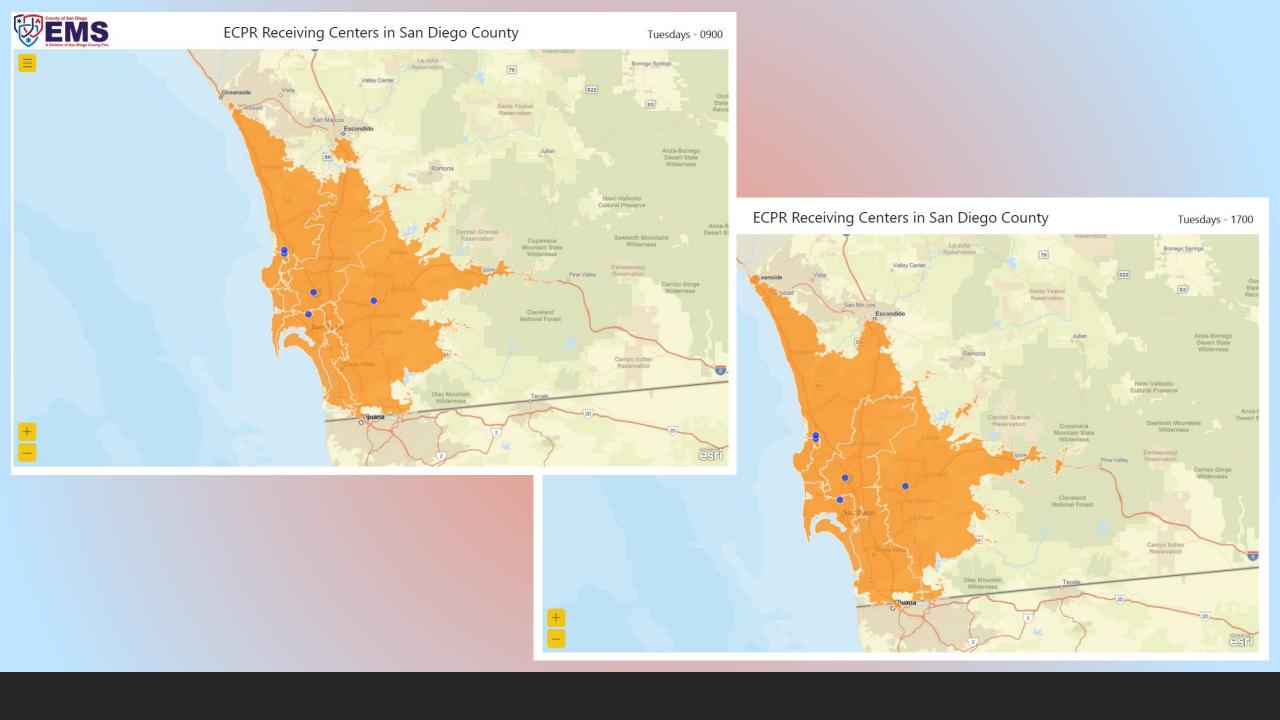
2022











A New Hospital Designation...

Significant change in longstanding culture and policy for cardiac arrest

EMS Protocol S 127 – page 6

San Diego County Emergency Medical Services Office Policy / Procedure / Protocol

VENTRICULAR FIBRILLATION / PULSELESS VT

- CPR
- Defibrillate as soon as monitor available/charged
- Defibrillate q2 min while VF/VT persists
- Epinephrine 1:10,000 1 mg IV/IO q3-5 min SO

Persistent VF/VT after 3 defibrillation attempts

- Amiodarone 300 mg IV/IO, MR 150 mg (max 450 mg) SO OR
- Lidocaine 1.5 mg/kg IV/IO SO, MR at 0.5 mg/kg IV/IO q5 min to max 3 mg/kg SO

Early Base Hospital contact should be considered for persistent or recurrent VF/pulseless VT

ECPR Receiving Center Criteria

- Facility Requirements (24/7 cath, ECMO/ECPR activation process)
- Staffing (Medical Director & Program Manager, ECMO/ECPR team)
- Data Management (Submission to LEMSIS & CARES; data points)
- Quality Improvement (Participation required, site-visits)
- Inclusion and Exclusion Process (Application)

Key changes to Protocol S-127

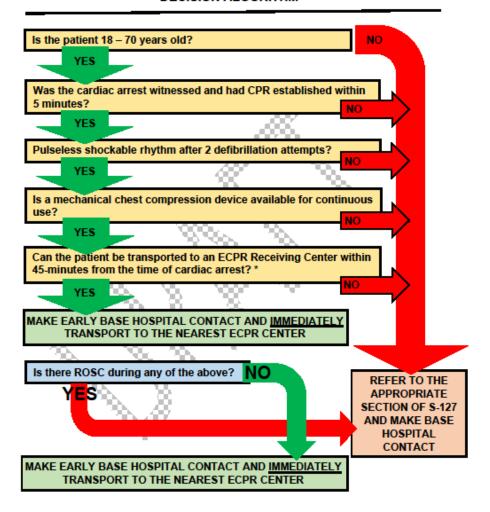
- Patients meeting criteria are <u>expeditiously transported off scene</u> to ECPR receiving center <u>after 2 shocks</u> delivered
- 2. Patients meeting criteria are to be <u>transported to ECPR receiving center</u> even if that means <u>bypassing non-ECPR capable hospital(s)</u>

ECPR in San Diego: Inclusion Criteria

- 1) Shockable rhythm is identified.
- 2) Witnessed cardiac arrest and CPR within 5 minutes of cardiac arrest
- 3) Estimated arrival in ECPR Center is 45 minutes or less from time of cardiac arrest
- 4) Age 18-70 *
- 5) Able to provide high-quality chest compressions during transport, with a mechanical compression device



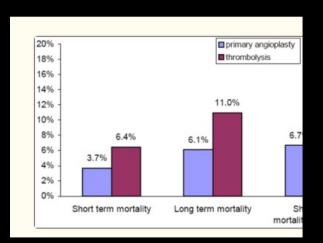
EXTRACORPOREAL CARDIOPULMONARY RESUSCITATION (ECPR) DECISION ALGORITHM



"May need to bypass non-ECPR designated facilities

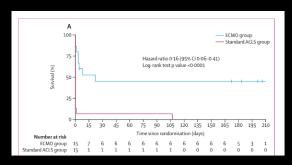
Cardiac Cath for STEMI

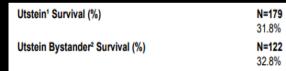




- 3.2 million people in San Diego
- 50 STEMI's/100,000 = 1664 STEMI's per year in SD
- Assume every STEMI gets emergent cath
- 4.9% improved mortality
- That means per year through our cath

programs we save 81 patients

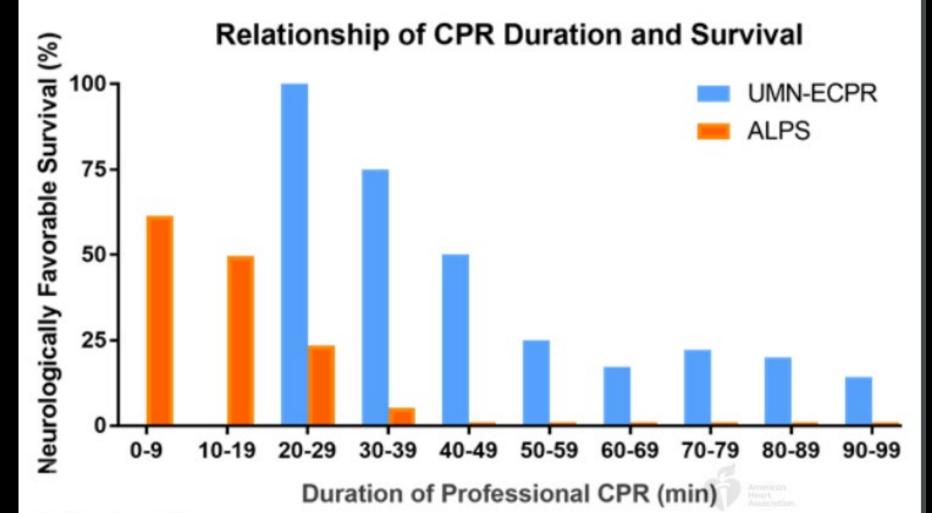




ECPR

- If every Utstein SD arrest got ECPR
- 43% absolute mortality benefit
- 179 patients per year
- We would save through this ECPR

program 77 patients



Patients at Risk

Time (min)	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
UMN-ECPR	0	0	8	12	20	36	35	27	15	7	160
ALPS	70	151	102	95	99	69	29	11	3	7	636

Evidence Basis

The ARREST trial:

https://www.thelancet.com/article/S0140-6736(20)32338-2/fulltext

EI SEVIED

Available online at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation



Clinical paper

Implementation of a regional extracorporeal membrane oxygenation program for refractory ventricular fibrillation out-of-hospital cardiac arrest

Nichole Bosson ^{a,b,c,·}, Clayton Kazan ^d, Stephen Sanko ^{e,f,l}, Tiffany Abramson ^{e,f}, Marc Eckstein ^{e,f}, David Eisner ^g, Joel Geiderman ^{h,l}, Walid Ghurabi ^{c,l}, Vadim Gudzenko ^{c,k}, Anil Mehra ^{e,f}, Sam Torbati ^h, Atilla Uner ^{c,k}, Marianne Gausche-Hill ^{a,b,c}. David Shavelle ^m

The Hyperinvasive Trial https://www.acc.org/about-acc/press-releases/2021/05/17/04/23/hyperinvasive-

care-improves-survival-in-refractory-out-of-hospital-cardiac-arrest

ECPR and Resuscitative ECMO textbook, 2021:

https://www.elso.org/Publications.aspx

www.ELSO.org

ASAIO Journal 2021

TSD:

ELSO Guidelines

Extracorporeal Cardiopulmonary Resuscitation in Adults. Interim Guideline Consensus Statement From the Extracorporeal Life Support Organization

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Disclaimer: Veno-arterial extracorporeal membrane oxygenation (ECMO) is increasingly being deployed for selected patients in cardiac arrest who do not attain a native circulation with conventional CPR (ECPR). This ELSO guideline is intended to be a practical guide to implementing ECPR and the early manage-

INTRODUCTION

Extracorporeal cardiopulmonary resuscitation (ECPR) is the application of extracorporeal membrane oxygenation (ECMO) in patients where conventional cardiopulmonary resuscitation

Questions/Comments?

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